**Scottish National Blood Transfusion Service**
**Policy Record**

**Ref: NATP CLIN 047 01**
**Cat: CLINICAL**

**Title:**
# PROVISION OF BLOOD COMPONENTS FOR PATIENTS WITH A SPECIAL TRANSFUSION REQUIREMENT

## Background:

There are a number of clinical scenarios in which a patient may be deemed to have a special transfusion requirement. This policy replaces a number of standalone policies to provide a comprehensive overview of the SNBTS approach to such patients, including the indications for provision of irradiated cellular blood components, CMV negative blood components, and washed red cells as well as provision of components for transfusion to patients born after 1st January 1996.

In each clinical scenario, the consequences of a delay of transfusion due to sourcing appropriate components which meet the special transfusion requirement should always be balanced against the risk of delayed transfusion. In an emergency it may be appropriate to issue standard red cell, plasma or platelet components, while documenting the rationale for doing so.

This policy does not cover the provision of red cells for patients with alloantibodies or transfusion support for patients undergoing ABO incompatible haemopoietic stem cell transplantation.

**Key Change From Previous Revision:**
This is a new policy and it replaces local and national policies as detailed below. *These policies are unchanged except where indicated.*

- NATP CLIN 005 02: Use of imported fresh frozen plasma (FFP) and cryoprecipitate to treat those born on or after 1st January 1996 and adult patients with thrombotic thrombocytopenic purpura.
- NATP CLIN 07 005 03: Provision of Kell negative red cells for female patients of less than 51 years of age
- NATP CLIN 11 021 02: Revised indications for the use of CMV seronegative blood components
  *Policy changed to allow granulocytes to be made from CMV seropositive donations where clinically appropriate*
- NATP CLIN 14 025 01: The use of plasma-reduced red cells and platelets
  *Components renamed to 'washed red cells' and 'platelets in additive solution'*
- NATP CLIN 019 02: Policy on the front line use of apheresis platelets in children
- NATP NEO 98 003 - Dedication of Components for Neonates & Infants Under 1 Year.
- NATP COMP 12 001 01 Platelets in PAS
- NATP COMP 12 004 01: Washed red cells in additive solution

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| **Date Of Implementation:** | 27th February 2019 | | |

## STATEMENT OF POLICY

### Background

There are a number of clinical scenarios which result in a patient having a specific transfusion requirement. Good communication between clinicians looking after the patient and the hospital blood bank is key to ensuring that blood components which meet the specific requirement are supplied in a timely manner.

It is the responsibility of the clinicians caring for the patient to notify the laboratory immediately that a special transfusion requirement is identified. The duration of the special requirement should also be documented. In some cases this may be lifelong; in others it may be time-limited. The special requirement should be documented in the patient's medical notes and electronic medical record. A patient information leaflet (NATL 057) containing both a sticker for the medical notes and a card for the patient to carry is available for patients requiring irradiated blood components, and should be given to patients with this special requirement.

The LIMS, Traceline, will automatically apply protocols which control issue of components to a patient's electronic transfusion record in some circumstances, for example patients born after 1st January 1996. For patients requiring CMV negative or irradiated components, it is the responsibility of the transfusion laboratory staff to add appropriate protocols to the patient's record when notification of a specific transfusion requirement is received, as described in the Traceline user manual- patient (MANUAL 003).

### If specific requirements are not met

It may be appropriate on occasion to issue components which do not meet a patient's special transfusion requirement when the risk of delayed transfusion outweighs the risk of transfusion of a standard component, for example in life threatening haemorrhage. Under these circumstances, the clinician or biomedical scientist may authorise issue of standard components, in accordance with this policy. In an emergency, clinician input is not essential if it will delay emergency transfusion; however it is advisable that they are notified.

If a special transfusion requirement is missed and a component not meeting the requirement is inadvertently transfused, this must be raised as a quality incident and investigated appropriately in accordance with the SNBTS policy for reporting and management of quality related incidents (NATP QAL 004). It is important to consider both the actual outcome, that is whether the patient came to harm, as well as the theoretical risk of harm the patient may have come to when quantifying risk. The incident should also be reported to SHOT as a case of 'incorrect blood component transfused- specific requirements not met' may also be reportable to SABRE, depending on the circumstances of the event. It is also important to note that if the unintended incident lead to patient harm, the incident must be discussed with the patient, in accordance with duty of candour guidance.

| Sections in NATP CLIN 047: | Page |
|---|---|


## 1. Patients born on or after 1st January 1996

**Background**

Risk reduction measures to prevent transfusion related transmission of Variant Creuztfeld Jacob Disease (vCJD) include universal leucodepletion and the deferral of donors who have been transfused in the UK since 1980. In addition, SaBTO recommends extra measures are in place to prevent transfusion- associated vCJD exposure in those who have not previously been exposed via the food chain: patients born on or after 1st January 1996. These measures are discussed in detail below.

### 1.1 Platelets

1.1.1 SNBTS recommends and provides apheresis platelets for all recipients born on or after 1st January 1996. In an emergency, or shortage, pooled platelets in PAS may be used.

### 1.2 FFP and Cryoprecipitate

1.2.1 It is SNBTS policy that patients who are born on or after 1st January 1996 should be given imported plasma derived components. These patients should receive methylene-blue treated FFP or solvent-detergent plasma (Octaplas LG) and methylene-blue treated cryoprecipitate.

1.2.2 In exceptional circumstances it may be considered clinically appropriate or necessary to use UK derived plasma components. This situation could arise in a variety of scenarios including:

- When no suitable imported plasma component is available in the time frame required, for example in the management of massive haemorrhage.
- Patient born on or after 1st January 1996, with a known allergy to Methylene Blue or Patent Blue, and requiring cryoprecipitate.
- Allergic reaction to imported FFP or Methylene Blue treated cryoprecipitate

Under these circumstances a UK derived plasma component may be issued. The rationale should be documented.

The use of fibrinogen concentrate to correct hypofibrinogenaemia may also be considered where appropriate, however it is important to appreciate that this product is not licensed for use in acquired hypofibrinogenaemia.

## 2. CMV seronegative cellular blood components

**Background**

The Advisory Committee on Safety of Blood Tissues and Organs (SaBTO) reviewed the indications for the use of cytomegalovirus (CMV) seronegative blood components (red cell concentrate and platelets) and published their recommendations in March 2012.

### 2.1 Indications where CMV seronegative components may be required

2.1.1 Intrauterine Transfusion

- CMV seronegative red cell and platelet components are required for intrauterine transfusion

2.1.2 Neonatal top up and exchange transfusion

- CMV seronegative negative red cells are required for top-up and neonatal exchange transfusion up to 6 months post delivery irrespective of gestational age.
- The actual requirements is up to 28 days post expected date of delivery (i.e. 44 weeks corrected gestational age) but due to the difficulty in communicating the corrected gestational age for every neonate, issuing CMV-negative components up to 6 months post delivery irrespective of gestational age provides a safety net to comply with the SaBTO recommendations.
- All cellular blood components of fetal/neonatal/infant specification for use up to 1 year of age are currently CMV negative, so are compliant with the SaBTO recommendation.

2.1.3 Elective transfusions in pregnancy

- CMV negative red cell and platelet components should be used for elective transfusion in pregnancy. Many of these transfusions will be administered to pregnant women with thalassaemia or sickle cell disease. This intervention aims to reduce the risk of primary maternal CMV infection with resulting congenital CMV infection of the fetus.

2.1.4 Granulocyte transfusion

- CMV seronegative granulocyte components ('buffy coats') should be considered for CMV seronegative recipients.

**2.2 Indications where CMV seronegative components are <u>not</u> required**

2.2.1 It is <u>not</u> necessary to provide CMV seronegative red cell and platelet components to the following patient groups:

- Adults and children undergoing haemopoietic stem cell transplantation, or who may undergo haemopoietic stem cell transplantation in the future.
- Adults and children undergoing solid organ transplantation.
- Immune deficient patients, including those with HIV.
- Emergency transfusions in pregnancy and transfusion at time of delivery. For this reason, emergency O RhD negative blood for use in obstetrics does not need to be CMV negative.

2.2.2 The introduction of universal leucodepletion is considered to be adequate risk reduction for these patient groups, particularly when combined with improved techniques for monitoring these patients for evidence of CMV infection.

**3. Irradiated cellular blood components**

**<u>Background</u>**

Transfusion associated graft versus host disease (TA-GvHD) is a potentially lethal complication of transfusion, caused by viable T lymphocytes present in a cellular blood component. Under circumstances where the transfusion recipient is immunosuppressed, or the HLA type of the donor is closely matched to the recipient (for example transfusion from a family member), these lymphocytes may cause a clinical picture similar to that seen post allogeneic stem cell transplant, with skin rash, GI upset and hepatitis. Severe marrow hypoplasia is often seen and the condition is universally fatal.

Irradiation of cellular blood components inactivates any residual donor lymphocytes, reducing the risk of TA-GvHD. Red cell, platelet and granulocyte components should be irradiated for at risk groups, as discussed in more detail below. Irradiation of red cells may be performed within 14 days of donation, and the irradiated unit has a shelf life of 14 days. Platelets can be irradiated at any point post donation and does not affect platelet shelf life. It should be noted that all platelets supplied by SNBTS are irradiated. Irradiated components can also be safely transfused to patients who do not fall into the at risk groups below. It is not necessary to irradiate FFP, cryoprecipitate or other plasma products.

A patient information leaflet containing a card for the patient to carry documenting their requirement for irradiated components, as well as stickers to affix to the medical notes is available (NATL 057) and should be distributed to these patients.

## 3.1 Circumstances where irradiated components may be required

3.1.1 Intrauterine and neonatal exchange transfusion

- Red cells for intrauterine and neonatal exchange transfusion must be irradiated. Due to the risk of hyperkalaemia in these patients, cells should be transfused within 24 hours of irradiation to minimise this risk, and by 5 days from donation.
- Platelets for intrauterine transfusion must be irradiated.

3.1.2 Neonatal top-up transfusion

- If there is a history of intrauterine red cell or platelet transfusion (IUT), irradiated red cells and platelets should be provided for neonatal top up transfusion, until 6 months after the expected date of delivery.
- When there is no history of IUT, irradiation of red cells or platelets is not required for top up transfusion of preterm or term infants.

3.1.3 Congenital T cell immunodeficiency syndromes

- Irradiated components are required for patients with severe T lymphocyte immunodeficiency syndromes including: SCID, Di George's. Wiskott-Aldrich syndrome, purine nucleoside phosphorylase deficient, cell-mediated immunodeficiency, reticular dysgenesis, adenosine deaminase deficiency, MHC Class I and II deficiency, leucocyte adhesion deficiency, immunodeficiency with eosinophilia, ataxia telangiectasia, chronic mucocutaneous candidiasis

3.1.4 Acquired T cell immunodeficiency

- There is no requirement to issue adults or children with HIV or AIDS irradiated components.

3.1.5 Cardiac surgery

- Patients undergoing cardiac surgery who have a coexisting immunodeficiency syndrome (for example patients with DiGeorge Syndrome) should receive irradiated components. In case of doubt err on the side of caution if the child is still to be investigated.

- There is no requirement to provide irradiated components to adults or children undergoing cardiac surgery who do not have evidence of a co-existing immunodeficiency syndrome.

3.1.6 Donations from first and second degree relatives and HLA selected components

- All donations from first or second degree relatives must be irradiated.
- All HLA selected platelets must be irradiated

3.1.7 Haemopoietic stem cell transplantation

3.1.7.1 Allogeneic stem cell transplantation

- Recipients of allogeneic stem cell transplants should receive irradiated components from the start of conditioning chemotherapy
- Irradiated components should continue to be provided while the patient remains on GvHD prophylaxis, or until the lymphocyte count is >1. If there is chronic GvHD, irradiated components should be provided indefinitely.
- Donors of allogeneic stem cells should receive irradiated components if transfusion is required in the 7 days prior to stem cell donation.

3.1.7.2 Autologous stem cell transplantation

- Recipients of autologous stem cell transplantation should receive irradiated components from the start of conditioning until 3 months post transplant (6 months if total body irradiation was used in conditioning).
- Autologous stem cell donors should receive irradiated components if transfusion is required in the 7 days prior to stem cell collection.

3.1.8 Hodgkin lymphoma

- All patients diagnosed with Hodgkin lymphoma should receive irradiated blood components lifelong. The risk of TA GvHD is unrelated to treatment or disease stage.

3.1.9 Drugs

3.1.9.1 Purine Analogues

- Patients treated with purine analogues (fludarabine, cladribine, deoxycoformicin) should receive irradiated components indefinitely
- Clofarabine and Bendamustine have a similar mode of action to the purine analogues mentioned above, and patients receiving these drugs should also be provided with irradiated components indefinitely.

3.1.9.2 Alemtuzumab

- Patients treated for haematological indications with alemtuzumab (anti-CD52) therapy should receive irradiated blood components
- Patients receiving alemtuzumab as part of conditioning prior to solid organ transplant should also receive irradiated components.
- Patients receiving alemtuzumab as treatment for autoimmune conditions including multiple sclerosis and rheumatoid arthritis should receive irradiated components.

3.1.9.3 Anti-thymocyte globulin

- Patients with aplastic anaemia may be treated with the potent immunosuppressant anti-thymocyte globulin (ATG). These patients should be provided with irradiated blood components.

**3.2 Circumstances where irradiated components are <u>not</u> required**

3.2.1 Irradiated blood components are not required for patients undergoing routine surgery or those with solid tumours, HIV, autoimmune disease, or undergoing solid organ transplantation, unless a drug treatment for the condition is itself an indication for irradiated components (see 3.1.9).

3.2.2 Patients with non Hodgkin lymphoma should receive standard blood components unless drug treatment for the condition is itself an indication for irradiated components (see 3.1.9).

3.2.3 Patients treated with rituximab (anti-CD20) should receive standard blood components

3.2.4 Emergency transfusion of patients at risk of TA-GVHD

- If emergency transfusion of a patient in the patient groups discussed in section 3.1 is required, and an irradiated component is not available in the time frame required, a standard red cell or platelet component may be issued. The rationale should be documented.

- The patient should be monitored for signs of TA-GVHD in the weeks following transfusion.

## 4. Provision of K negative red cell components for women of less than 51 years of age

**Background**

Anti-K antibodies may cause significant haemolytic disease of the fetus and newborn. It is therefore important to avoid sensitisation of women with child bearing potential by transfusion related exposure to K antigen.

4.1 Provision of K negative red cell components

- All female patients under 51 years of age are to receive, wherever possible, K negative red cells. K positive units may be used in exceptional circumstances where no other alternative is available and delays in provision of transfusion support could result in an adverse outcome.

## 5. The use of 'washed' components (red cells, washed, leucocyte depleted and platelets in additive solution, leucocyte depleted)

**Background**

Washed red cells and platelets are indicated for patients with reactions to, or at risk of side effects from, substances contained in plasma, including proteins such as Immunoglobulin A and cytokines.

Red cells

Washed red cells are indicated for patients with recurrent severe allergic reactions to standard red cell components and other rare indications. The washing process removes virtually all plasma from red cell concentrates and is completed by re-suspension in an alternative solution. The additive solution used is SAGM (Saline, Adenine, Glucose and Mannitol) which is also used for 'standard' red cells issued by SNBTS. Washing red cells does result in some loss of red cells (approximately 3g per unit).

Red cells are washed using a closed system method, which provides a component that has a 14 day post shelf life after washing (at the standard red cell storage temperatures of 2 - 6°C). Washed and irradiated red cells will be made from red cells less than 14 days of age and carry a shelf life of 24 hours post irradiation.

Platelets

Platelets in additive solution, leucocyte depleted ('washed platelets') are indicated for patients with recurrent severe allergic reactions to standard platelet components and other rare indications.

SNBTS provides platelets resuspended in platelet additive solution (PAS), which are prepared using a closed system. These platelets have a reduced shelf-life of 24hrs post manufacture. Washing platelets in PAS also results in some loss of platelets. This is a different component to pooled platelets in PAS and plasma, which has approximately 35% plasma and is issued as a routine component..

Requesting 'washed' components

All requests for washed components must be authorised by SNBTS medical staff.

Hospitals should be encouraged to plan these transfusions as far in advance as is practical.

SNBTS can, however, manufacture these components on a 24/7/365 basis. Preparing 2 units of washed concentrated red cells re-suspended in SAG-M or one ADE platelets in PAS takes approximately 3-4 hours. Additional time should also be allowed for transporting the component from SNBTS to the hospital blood bank.

In an emergency situation the risks and benefits of waiting for washed red cells should be carefully considered by the treating clinician.

## 5.1 Indications for use of 'washed' components

In all of these scenarios the consequences of a delay of transfusion should always be balanced against the risk of a reaction. In an emergency, standard red cells in SAG-M and standard pooled platelets in PAS should be used.

5.1.1 Consideration for the provision of washed components should be made in the following clinical situations:

- Recurrent moderate or severe allergic transfusion reactions
- Recurrent febrile transfusion reactions that have been unresponsive to premedication with paracetamol
- IgA deficiency with a history of moderate or severe allergic reactions, or moderate or severe transfusion reactions should receive either IgA deficient blood components from an IgA-deficient donor (particularly in very severe cases) or plasma - reduced red cells and platelets. See NATP CLIN 034 for further discussion about the transfusion management of patients with IgA deficiency.
- Unexplained severe hypotensive transfusion reactions

5.1.2 The use of washed components may be considered in the following clinical situations

- Patients who are known to have IgA deficiency, but give no history of allergic reactions, but are likely to require repeated transfusions in the future.
- Patients who have a past medical history of Post Transfusion Purpura (PTP) or mothers of children who had Neonatal Alloimmune Thrombocytopenia (NAIT) may be considered to receive washed red cells if HPA selected units are not available.

5.1.3 The following are rare indications for the use of washed components

- As a means to avoid passive transfusion of haemolysins in some ABO incompatible haemopoietic stem cell and solid organ transplants.
- Neonates with T-activation, *and* haemolysis following transfusion with standard components, should where possible receive platelets in platelet additive solution (PAS).
- As a means to allow transfusion of platelets of a rare phenotype where haemolysins or other antibodies in the donation may be a contra-indication.

## 6. Dedication of components to infants and neonates under 1 year

**Background**

This policy covers the situation where a single donation is divided (split) to provide several transfusion doses (in SNBTS **four** splits) from the same donor. These split donations are issued for the treatment of neonates and infants of less than 1 year of age. Recommended usage of these split components will depend on whether or not they have been subject to a virus inactivation step.

6.1 For components not subject to a virus inactivation step

- For this category of products (red cells, platelets) the entire donation is to be dedicated for a single infant. Unused packs will be discarded.

6.2 For components subject to a virus inactivation step

- Split plasma donations, which have been subjected to methylene blue treatment will be issued to single hospitals. This will allow a single patient to receive multiple sub-units. However, unused packs can then be used to treat another neonate.

## References

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2. SaBTO Guidance, 2015 https://www.gov.uk/government/publications/current-measures-to-reduce-the-risk-of-vcjd-transmission-by-blood
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4. Guidelines for the Blood Transfusion Services in the UK 8th Edition https://www.transfusionguidelines.org/red-book/chapter-7-specifications-for-blood-components/7-21-components-suitable-for-use-in-intrauterine-transfusion-neonates-and-infants-under-1-year
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